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Forest Insect And Disease Management

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FOREST INSECT
AND DISEASE
CONDITIONS IN ALASKA
R-10
1983

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FOREST INSECT AND DISEASE CONDITIONS IN ALASKA

R-10

1983

Forest Pest Management
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FOREST INSECT AND DISEASE CONDITIONS IN ALASKA: 1983

CONDITIONS IN BRIEF

Spruce bark beetle activity continued to cause the most insect damage to forested areas in Alaska during 1983. Infestations covered approximately 132,712 hectares of white and Sitka spruce, a 30 percent decrease over 1982 levels. White spruce mortality is occurring on 15,929 hectares of the Chugach National Forest; a 15 percent decrease over 1982 levels. Spruce beetle activity, near the confluence of the Tiekel and Tsina Rivers in interior Alaska, is increasing; almost 600 hectares of scattered, infested white spruce were aerially detected this year. No spruce beetle activity was detected in interior Alaska. Interior Alaska engraver infestations are low; only 54 hectares were infested. Eastern larch beetle infestations are also low but increasing; forty-five infested hectares of larch were detected in 1983, an 80 percent increase.

Large aspen tortrix defoliated 13,775 hectares of quaking aspen throughout south-central and interior Alaska; a 17 percent increase over 1982 defoliation levels. Spruce budworm populations are increasing in the Anchorage, Copper Center and southeastern Alaska areas; 1,100 hectares of defoliated white and Sitka spruce were detected in 1983. The 504 hectares of black-headed budworm defoliated hemlock in Prince William Sound in 1982 increased (93%) to 6,761 hectares in 1983. The largest increase in 1983 defoliator activity occurred in interior Alaska where the spear-marked black moth defoliated 35,400 hectares of paper birch. No damage of this defoliator was aerially detected in 1982. Spruce aphids defoliated 756 hectares of Sitka spruce near Icy Bay in Prince William Sound. The defoliation was light to moderate and scattered.

Spruce needle rust levels were low throughout Alaska; only 557 hectares of infected spruce were detected in southwestern Alaska. Spruce needle cast was again commonly encountered on white and Sitka spruce throughout

south-central. Leaf spotting of aspen was, for the second year, apparent on 2,551 hectares near Sterling on the Kenai Peninsula, a 22 percent increase over 1982 levels. Winter drying was responsible for 1,890 hectares of defoliated white spruce in interior Alaska near Circle.

In southeast Alaska, the most significant forest insect pests in 1983 were the hemlock sawfly and the striped ambrosia beetle. The sawfly population, which defoliated over 25,000 hectares, reached its highest level in nearly 20 years. Damage was most evident in the southern half of Prince of Wales Island, with significant patches of defoliation occurring on Admiralty and Chichogof Islands as well. For the third consecutive year, timber harvesters reported ambrosia beetle damage in various parts of southeast Alaska. Spruce beetle populations have declined in southeast; currently the only active infestation is in Glacier Bay National Park where 2,500 hectares of Sitka spruce have been infested. Spruce needle aphids were strictly a localized urban problem in 1983, attacking spruce around Sitka and Ketchikan. Alaska yellow cedar dieback and hemlock dwarf mistletoe continue to be the diseases of major importance in southeast Alaska.

STATUS OF INSECTS

SPRUCE BEETLE, Dendroctonus rufipennis (Kirby)

Alaska spruce beetle populations have decreased since last year; infestations covered approximately 132,712 hectares in 1983. This decrease (35%) was most apparent in the Beluga Lake area on the west side of Cook Inlet where infested areas cover 89,031 hectares. This infestation has been active since the early 1970s. The infested stands are comprised of hardwoods (50%) and spruce (50%). After more than a decade, there remains little uninfested, susceptible spruce resulting in a general decline of beetle activity. The 19,406 hectares of spruce mortality detected in 1982 along the Susitna River had decreased by 75 percent. Scattered white spruce mortality is occurring on 5,004 hectares extending from the upper reaches of Devil's Canyon to Gold Creek along both sides of the Susitna River. The most active beetle spots occur along Portage Creek. White spruce mortality is occurring on 15,929 hectares of the Chugach National Forest; a decrease of 996 hectares (15%) over the area infested in 1982. The Summit Lake infestation has not expanded from the 1982 level of 3,907 hectares of white spruce.

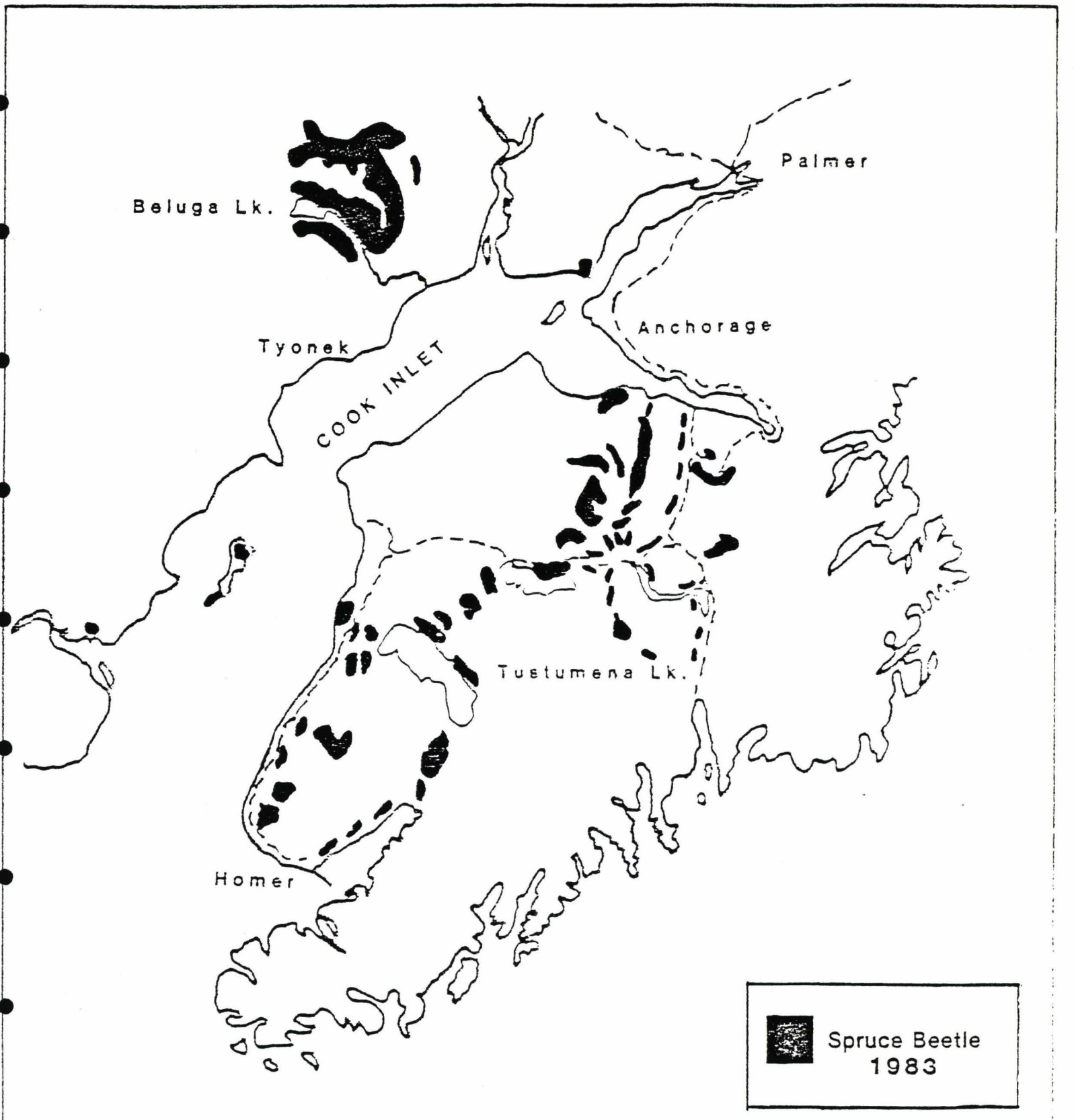
SPRUCE BEETLE INFESTATION ALONG THE EDGE OF SUMMIT LAKE

The Resurrection Creek infestation on the Kenai Peninsula has expanded by 2,000 hectares from the 1982 level of approximately 6,000 hectares. The major portion of the infestation has occurred along the Resurrection Creek bottom lands. However, more than 80 percent of the susceptible spruce in this area has been killed. Little beetle activity will be observed in future years. Increased beetle activity is most noticeable throughout the side drainages feeding into Resurrection Creek and will continue to be apparent for a few more years. This outbreak, as well as others on the Chugach National Forest, are static to declining as almost all the susceptible host material has been killed.

Elsewhere on the Kenai Peninsula, spruce beetle activity has increased over 1982 levels. Approximately 17,616 hectares of infested white and Sitka spruce were aerially detected on the Kenai National Wildlife Refuge, an increase of eight percent over the 1982 level. Beetle activity is still high (11,688 ha.) northeast of Mystery Hills but will probably decline in a few years as susceptible host material becomes limited.

Infestations are increasing at the southern end of the Kenai Peninsula over 1982 levels. Approximately 3,285 hectares of infested spruce were aerially detected in 1983. The major increase in activity is located along the Fox River drainage near Homer where 2,079 hectares of scattered Sitka spruce are infested.

Infestations have decreased by 36 percent on the west side of Cook Inlet over levels infested in 1982. Scattered spruce beetle infestations of 87,735 hectares were aerially detected in 1983. The areas of heaviest infestation still occur north of lower Beluga Lake and are continuing to expand in a northerly direction. This outbreak will continue to decline as there is little susceptible host material remaining after more than ten years of beetle activity. Thirty permanent, variable radius plots were established this fall in the vicinity of Judd Lake. These plots will provide us with information concerning spruce bark beetle activity in a mixed (50/50) spruce-hardwood forest. Plots will be visited annually for five years.



SPRUCE BEETLE INFESTATION

COOK INLET

1983

Spruce beetle activity is increasing along the Richardson Highway near the Tiekel and Tsina Rivers. Almost 600 hectares of scattered infested white spruce were detected in 1983. Ground checks throughout the infested area have shown an increasing trend in population numbers. In the fall of 1983, 15 permanent, variable radius plots were established in the Tiekel-Tsina area to monitor beetle activity, damage, volume losses, and stand changes over a five year period.

In southeast Alaska, spruce beetle activity has declined somewhat from recent years. At present, the only active infestation is in Glacier Bay National park where 2,500 hectares of Sitka spruce are affected. Although the Glacier Bay outbreak increased in size, the rate of spread appeared to be less than in previous years. An examination of ground plots confirmed that, in general, beetle populations in the park may be declining. At present, the highest level of beetle activity appears to be near the mouth of Berg Bay and on Lester Island, about one mile north of the Glacier Bay Lodge. No additional Sitka spruce mortality was noted in the Taku or Whiting River drainages. Old spruce beetle infestations along these two rivers now total slightly more than 1,100 hectares, and both appear inactive. Some new areas were flown during the 1983 aerial detection survey and additional old dead spruce were noted, particularly along the Speel Arm of Port Snettisham, and along the Klehini and Chilkat Rivers near Haines. These infestations have probably also run their course, since there is no evidence of recent beetle kill among these dead spruce.

1983 spruce beetle infestations by ownership are as follows: National Forest Land - 15,939 hectares; State and private - 89,375 hectares; and other Federal Lands (e.g. Kenai National Wildlife Refuge, National Monuments, etc.) - 38,556 hectares.

EASTERN LARCH BEETLE, Dendroctonus simplex (LeC.)

Eastern larch beetle activity increased slightly in 1983 after two to three years of inactivity in interior Alaska. The largest concentration of larch beetle activity (45 ha.) is occurring southwest of the west fork

of the Dall River adjacent to the Trans-Alaska Pipeline. Larch beetle activity will continue to be scattered and low as most of the susceptible host material was killed in the large infestation in the early 1970s.

ENGRAVERS, Ips perturbatus (Eichh.)

Engraver infestations have decreased by 50 percent in interior Alaska; approximately 45 hectares of scattered white spruce were infested in 1983 compared to 95 hectares the previous year. This year's infestations are occurring 15 km north of Vundik Lake.

AMBROSIA BEETLE, Trypodendron lineatum (Oliver)

For the third consecutive year, the striped ambrosia beetle caused substantial problems in parts of southeast Alaska. Attacks on spruce and hemlock logs were reported in several localities on Prince of Wales Island, including the sort yards at Craig and Thorne Bay. Pheromone traps containing lineatin were used at both sort yards in an attempt to minimize attacks on high-quality logs. In the Yakutat area, where 100 million board feet of Sitka spruce and western hemlock blew down in 1981, ambrosia beetle attacks continued to accumulate on previously uninfested material. Following the 1983 flight season, T. lineatum attacks were noted on 53 percent of the down Sitka spruce and 33 percent of the western hemlock. A small study was conducted in Craig and Yakutat to determine the susceptibility of freshly cut to ambrosia beetle attacks. In Craig, trees felled in early March were attacked in the same spring or summer, while trees cut in April, May, and June did not sustain attacks.

Favorable climatic conditions for beetle flight were common throughout the summer on Afognak Island. A continuing control program began in May of 1983. Logs were chemically treated prior to shipment. Chemical treatment was continued throughout the summer as long as weather conditions were conducive for beetle flight.

SPRUCE BUDWORM, Choristoneura orae Free.

Ground surveys detected increased budworm damage to white spruce in residential and park areas of Anchorage. Budworm populations once again increased between Copper Center and Chitina. Ground surveys detected moderate to high larval numbers on 500-1000 hectares of spruce. Resulting defoliation was however, low. Only 50 percent of the current years growth was feed upon. No webbing occurred in the upper crowns. 1983 aerial surveys did not detect any defoliation. Likewise, C. orae activity increased throughout the Kenai Peninsula but populations are moderate to low in these areas.

SPRUCE BUDWORM LARVAE

Scattered patches of slightly discolored Sitka spruce were observed throughout the northern part of the Tongass National Forest in 1983. These patches, totalling about 400 hectares, were most notable around Admiralty Island and the mainland east of there. Specifically, damage was noted on Glass Peninsula across from Pleasan Bay, Snettisham Peninsula, Mole Harbor, Hawk Inlet, and various points along the beach between Parker Point and Peanut Lake. Since the defoliation by the spruce budworm was very subtle, it may have gone unnoticed in other areas.

Spruce budworm life history and pheromone studies were continued throughout 1983 in cooperation with the Canadian Forestry Service. Results of these studies support the opinion that the Alaska budworm complex may include two or more species. Pheromone trapping studies near Copper Center and throughout the Kenai Peninsula lured predominately C. orae Free adults. However, trapping studies in southeast Alaska near Juneau and Haines lured budworm adults to traps baited with C. occidentalis Free. pheromones. Efforts will be continued to delineate the budworm species and the impact of this defoliator.

LARGE ASPEN TORTRIX, Choristoneura conflictana (Wlkr.)

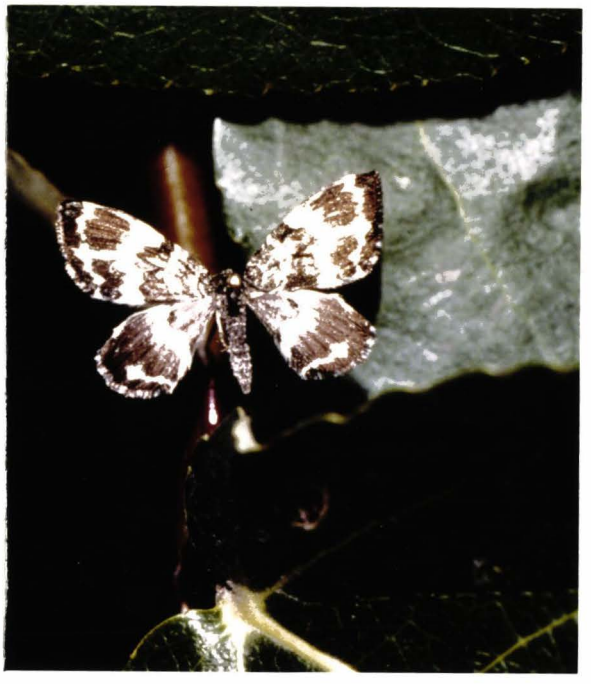
1983 aerial surveys detected tortrix defoliation of quaking aspen on 13,775 hectares; an increase of 1,264 hectares over 1982 levels. The majority of this population increase occurred near Big Delta where 9,514 hectares of aspen were defoliated. Near Pt. McKenzie, north of Anchorage, across Knik Arm; approximately 3,000 hectares of tortrix defoliated aspen were observed.

SPEAR-MARKED BLACK MOTH, Rheumaptera hastata (L.)

The spear-marked black moth defoliated 35,440 hectares of paper birch in interior Alaska in 1983. These defoliators have been at extremely low levels since the early 1970s when they defoliated close to a million hectares before populations collapsed due to the effects of parasites, predators, disease and weather.

Defoliation was spread around the Fairbanks area: 10,837 hectares were defoliated between Fairbanks and Nenana; 19,059 hectares were lightly defoliated 12 km east of Manley Hot Springs. If present populations follow past trends, we can expect dramatic increases in the areas defoliated for two to three years followed by a sudden decrease. Top kill and limited tree mortality can occur after consecutive years of defoliation.

LARGE ASPEN TORTRIX DEFOLIATION NEAR PT. McKENZIE



SPEAR-MARKED BLACK MOTH

WESTERN BLACK-HEADED BUDWORM, Acleris gloverana (Walsingham)

Western hemlock defoliation was detected on 6,762 hectares in the Port Gravina and Port Fildago areas of Prince William Sound. This is an increase of 6,200 hectares over 1982 levels. The majority of the defoliation in occurring on both old and young growth western hemlock with some damage to Sitka spruce. Mild winter and warm spring and summer temperatures were, in part, responsible for this dramatic increase. Populations are expected to increase in 1984 if temperature conditions are again favorable.

In southeast Alaska, black-headed budworm populations were at endemic levels during 1983. No visible defoliation was detected in the aerial survey. Results from ground plot sampling showed a general decline in budworm populations, with the total number of larvae being about half the number collected in 1982. The areas showing the greatest declines in larval numbers were Hood Bay (Admiralty Island), Calder Bay (N. Prince of Wales Island), and Irish Creek and Duncan Canal (Kupreanof Island). The greatest increases in black-headed budworm larvae were at Saks Cove (Behm Canal) and California Cove near Ketchikan.

SPRUCE NEEDLE APHID, Elatobium abietinum (Walker)

Evidence of spruce aphid feeding was aerially detected on 756 hectares of tidewater Sitka spruce north of Icy Bay. Pockets of defoliation were scattered throughout the area on both young growth and old growth spruce.

In 1983, the spruce needle aphid caused localized damage around Sitka and Ketchikan. Several homeowners reported aphid feeding on ornamental Sitka spruce. Despite a mild winter in 1982, aphid populations in the forest remained very low.

WILLOW DEFOLIATION

Aerial surveys detected approximately 4,987 hectares of defoliated willow northeast of Dillingham; the same general area which was defoliated in

1982. Likewise, thousands of hectares of defoliated willow were reported from the Nome and Kuskokwim areas. The causal agent has tentatively been identified as the birch leaf roller, Epinotia solandriana L., a leaf roller more commonly associated with birch.

HEMLOCK SAWFLY, Neodiprion tsugae (Midd.)

Populations of the hemlock sawfly increased dramatically in 1983 and defoliated over 25,000 hectares throughout southeast Alaska. Defoliation was most extensive on the southern half of Prince of Wales Island, and considerable damage was also noted on Admiralty, Chichagof, Dall, and Kuiu Islands. On Prince of Wales Island, sawfly defoliation was in large contiguous patches around Kendrick Bay and Klakas, Keete, and Nutkwa Inlets. Further north, smaller patches of hemlock defoliation were noted in the West and South Arms of Cholmondeley Sound, Skowl Arm, and Karta Bay along the Anderson Creek drainage to Big Salt Lake. Toward the northern end of Prince of Wales Island, damage was evident in small patches along Shaheen Creek, and east of Point Baker to Red Bay and Red Bay Lake. Along the east side of Dall Island, virtually all the south-facing slopes from View Cove to Pond Bay were defoliated by the hemlock sawfly. On Kuiu Island, moderate defoliation occurred between Bay of Pillars and Saginaw Bay. Nearly 5,000 hectares were defoliated on Admiralty Island, with the majority of this damage concentrated in the Mitchell Bay area. Other defoliation was noted in Hood Bay and Chaik Bay. On Chichagof Island, the most extensive damage was observed in Peril Strait from Todd to Broad Island. The northernmost evidence of hemlock sawfly damage was above the town of Hoonah and at Spasski Point where about 200 hectares were defoliated. Other areas where sawfly-caused defoliation was noted in 1983 included Madre de Dios Island, Heceta Island, Kasciusko Island (Edna bay), Bradfield Canal, Tuxekan Island, and Kupreanof Island between Duncan Canal and Port Camden.

Information from the larval survey also reflected the higher sawfly populations in 1983. Larvae were found in 57 of 74 plots, and the numbers increased nearly four-fold over 1982 levels. Highest numbers were found at Kendrick Bay, Polk Inlet, and Todd, with substantial

HEMLOCK SAWFLY LARVA

populations also present at Kanalku Lake, Bradfield Canal, Dora Bay, and Hood Bay. Increases in larval numbers without evidence of defoliation were noted at Security Bay (Kuiu Island), Mole Harbor (Admiralty Island), and Luck Lake (Prince of Wales Island). Larval numbers decreased in a few localities including Quiet Harbor (Etolin Island), Duncan Canal (Kupreanof Island) and the Misty Foirds plots (Saks Cove and Smeaton Bay).

GREEN-STRIPED FOREST LOOPER, Melanolophia imitata (Walker)

The green-striped forest looper was the most common of several geometrid defoliators on western hemlock in southeast Alaska. Its numbers and distribution were similar to 1982 levels when no visible defoliation was noted.

OTHER LOOPERS (Geometridae)

Populations of other loopers on western hemlock were also quite low in 1983. The most abundant of these other loopers, the saddleback looper (Ectropis crepuscularia (Denis & Schiff.)) and the Columbia brindle looper (Anthelia hyperborea) both decreased slightly from the low levels in 1982.

COTTONWOOD LEAF BEETLE, Chrysomela walshi Brown

Leaf beetle populations were slightly higher in southeast Alaska than in 1982. Residents of the Mendenhall Valley near Juneau reported light defoliation on cottonwoods and willows in their yards. Little evidence of leaf beetles were reported from south-central and interior Alaska in 1983.

STATUS OF DISEASES

SPRUCE NEEDLE RUST, Chrysomyxa ledicola Lagerl.

The incidence of spruce needle rust on white spruce decreased from 4,458 hectares in 1982 to approximately 557 hectares in 1983. The areas of heaviest activity were: 126 ha.-1 km south of Kaltag; 158 ha.-12 km east of Crooked Creek, and 179 ha. east of Walker Lake. Up to 90 percent of the current year's needles on all age classes of white spruce was infected. Spruce needle rust was at low levels in southeast Alaska.

SPRUCE BROOM RUST, Chrysomyxa arctostaphyli Diet.

Spruce broom rust was noted throughout the Sitka spruce stands at Glacier Bay (Fig. 8). This is in contrast to the rest of southeast Alaska where the rust is rare to absent.

HEMLOCK - BLUEBERRY RUST, Pucciniastrum vaccinii (Wint.) Joerst

Hemlock - blueberry rust was found lightly infecting western hemlock at Shaheen Dump, Prince of Wales Island; on the Norris Glacier flats up the Taku River; and at Thorne Bay, Prince of Wales Island.

INDIAN PAINT FUNGUS, Echinodontium tinctorium E.&E.

Two conks of Echinodontium were collected near Seward. This is the second confirmed collection of this fungus in Alaska. Baxter observed the fungus at Russian River, Moose Pass, and Skagway but an examination of his herbarium by Cook found no collections.

SPRUCE NEEDLE RUST INFECTED WHITE SPRUCE

SPRUCE BROOM RUST

CEDAR MORTALITY

Additional scattered areas of yellow cedar dieback totaling 250 hectares were found by aerial survey. The cause of the dieback, which occurs from the southern tip of Prince of Wales Island to the northerly portion of the Chichigof Island has yet to be determined. To date approximately 10,000 hectares of cedar dieback have been found in southeast Alaska.

HEMLOCK DWARF MISTLETOE, Arceuthobium tsugense (Rosend.) G.N. Jones

Hemlock dwarf mistletoe remains the most damaging tree disease in old growth western hemlock in southeast Alaska. A high proportion of the old growth hemlock stands between Haines and Portland Canal are infected.

SPRUCE NEEDLE CAST, Lophodermium piceae (Fuckel.) von Hohnel

Spruce needle cast which commonly occurs at low levels throughout southeast Alaska was very noticable north of Icy Bay. This disease is not normally considered to be serious in North America as it affects senescent needles or densely shaded needles in moist situations.

Spruce needle cast was apparent during the spring and summer throughout the Kenai Peninsula, especially in the Homer area, wherever spruce occur.

ASPEN LEAF SPOT

Leaf spotting of aspen was, for the second consecutive year, apparent on 2,551 hectares of mixed stands near Sterling and Soldotna on the Kenai Peninsula, a 22 percent increase over 1982 levels. The causal agents were identified as fungi of the genus Marssonina and Septoria. Repeated attacks by these fungi can retard tree growth by reducing the photosynthetic areas of leaves, and in serious infestations can cause branch dieback and predispose trees to other diseases or to winter injury. The spread the fungi is favored by wet spring weather. No practical controls are available in forested areas.

WINTER-KILLED SPRUCE

1983 aerial surveys detected 1,890 hectares of dead and dying white spruce in interior Alaska near Circle. A ground check did not find any biotic agents responsible for the repeated damage. Winter drying (red belt) was thought to be the causal agent. Ground checks are planned for the 1984 field season to determine the cause(s) responsible for the damage.

INTEGRATED PEST MANAGEMENT ACTIVITIES

Integrated pest management has been described as "a systems approach to reducing pest damage to tolerable levels through a variety of techniques, including predators and parasites, genetically resistant hosts, natural environmental modifications and, when necessary and appropriate, chemical pesticides." Considering the broad parameters offered by this definition a listing a Region 10 IPM activities conducted by FPM is as follows:

(1) Field tests of two formulations of Bacillus thuringiensis (B.t.)-Thuricide and Dipel. The purpose of the application was to determine effectiveness against 4th and 5th instar Large Aspen Tortrix larvae. The applications were made on Native Corporation lands near Anchorage the last week in May. Both formulations were effective in reducing populations and preventing excessive defoliation on aspen.

(2) Field test of two chemicals-Lindane and Sevin-and a pulp mill by-product known as pine oil to determine effectiveness in preventing spruce beetles from attacking white spruce. Both chemicals appear to be 99% effective. The pine oil however, seemed to act as an attractant. The data will be used to obtain an extension for both Lindane and Sevin as a protective spray. Registration, based on performance over two field seasons, could occur as early as December 1984. A different batch of pine oil will be field tested in 1984.

(3) The establishment of dwarf mistletoe demonstration plots on the Thorne Bay Ranger District. The purpose of the plots is to demonstrate various aspects of dwarf mistletoe biology, impact, and control in second-growth western hemlock stands. The target audience includes foresters, silviculturists, and a variety of land managers. The first demonstration workshop was held in June.

(4) The outplanting of white spruce containerized stock that had been innoculated with ectomycorrihizal fungi. The purpose of the

plantings is to determine if colonized seedlings outperform non-mycorrihizal seedlings. The outplantings will be monitored over the next four years.

(5) The testing of two herbicides-Glyphosate and Atrazine-to determine their effectiveness in controlling competing herbaceous and brushy vegetation in spruce plantations. The tests involved hand spraying three foot radius circular spots around previously planted spruce seedlings and on sites where seedlings are to be planted.

(6) Evaluation of methylcyclohexenone (MCH) in preventing or suppressing spruce beetle attacks on felled white spruce. The purpose of this test is to determine if this synthetic anti-aggregation pheromone can be effectively used to prevent or reduce to attack density to a level below the threshold required for the development of brood trees. The results of the test indicate that, although attacks are not prevented, they are significantly reduced.

(7) Participation in a cooperative effort with the Alaska Agricultural Research Station and the Cooperative Extension Service to provide pest management information to Alaska citizens. The program which includes education, research and survey activities, provides integrated pest management information concerning urban forestry and garden and greenhouse pests. The program includes an IPM Newsletter which is published on a bi-weekly basis. This is mailed statewide and contains information on pest occurrence and available control measures. The mailing list includes growers, gardeners, professional government agency personel, and Alaska master gardeners who use this information for education purposes.

There were four full-time pest scouts employed from May until October. In addition there are four Extension Agents working with the program. They devote approximately 135 man days to coordination, supervision, and education. The researchers from the Forest Service and ARS also contribute time. This amounts to about 85 days a

year. They also provide assistance and laboratory facilities for classification of collected pests. Each pest scout completed a collection of local pests. These are catalogued and made into displays for Extension Agents to use in future educational programs.

1983 Forest Insect and Disease Infestations
in Alaska by Ownership and Pest
in Hectares

PEST	NATIONAL FOREST	OTHER FEDERAL	NATIVE	STATE & PRIVA
SPRUCE BEETLE *Dendroctonus rufipennis*	15,939	38,556		89,375
LARCH BEETLE *Dendroctonus simplex*		41		5
ENGRAVERS *Ips* spp.		53	2	
SPRUCE BUDWORM *Choristoneura* sp.	609			491
LARGE ASPEN TORTRIX *Choristoneura conflictana*		6,220	315	7,241
SPEAR-MARKED BLACK MOTH *Rheumaptera hastata*				35,440
BLACK HEADED BUDWORM *Acleris gloverana*	3,764		2,115	882
SPRUCE NEEDLE APHID *Elatobium abietinum*		252		504
WILLOW DEFOLIATION		4,506	441	41
HEMLOCK SAWFLY *Neodiprion tsugae*	20,740		3,801	586
CEDAR DIEBACK	9,250		100	650
ASPEN LEAF SPOT		6061		1,953

PEST	NATIONAL FOREST	OTHER FEDERAL	NATIVE	STATE & PRIVA
WINTER-KILLED SPRUCE		1,890		
SPRUCE NEEDLE RUST *Chrysomyxa ledicola*		431	126	

TOTAL-INSECT: 231,919 hectares

TOTAL-DISEASE: 15,006 hectares

STATE TOTAL (Insect and Disease): 246,925 hectares

FOREST PEST MANAGEMENT
STATE AND PRIVATE FORESTRY R-10 (ALASKA)
BIOLOGICAL EVALUATIONS, TECHNICAL
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SUBMITTING INSECTS AND DISEASES FOR IDENTIFICATION

People interested in obtaining positive identification of insect and disease specimens should submit samples to specialists. The following procedures for the collection and shipment of specimens should be used:

Specimen Collection:

1. Adequate material should be collected.
2. Adequate information: The value of an insect or disease specimen depends on the information regarding its collection.
    a. Where the specimen was collected: nearest Post Office or town, elevation, aspect, and so forth.
    b. When the specimen was collected.
    c. Who collected the specimen.
    d. Host description (age, species, and general appearance).
    e. General condition of the surrounding area (fire, blowdown, logging, and so forth).
3. Personal opinion of the problem is very helpful.

Shipment of Specimens:

1. General:
    a. Pack specimens in such a manner that breakage will be minimal.
2. Insects: Specimens sent through the mail should be packed the withstand rough treatment.
    a. Larvae and other soft-bodied insects should be shipped in small screw-top vials or bottles containing at least 70 percent isopropyl (rubbing) alcohol. Make certain the bottles are sealed well. Include in each vial adequate information, or a code, relating the sample to the written description and information. Labels inserted in the vial should be written on with pencil or India ink. Do not use a ballpoint pen, as the ink is not permanent.
    b. Pupae and hard bodied insects may be shipped either in alcohol or in small boxes. Specimens should be placed between layers of tissue paper in the shipping boxes. Pack carefully and make certain that there is very little movement of material within the box. Do not pack insects in cotton.
    c. Adult moths, butterflies and fragile insects should be carefully placed between layers of tissue paper before packing.
3. Needle Diseases:
    a. Do not ship in plastic bags. Sprinkle lightly with water before wrapping in newspaper.

Shipping:

1. Ship as quickly as possible. If samples cannot be shipped rapidly, store them in a refrigerator.
2. Include address inside shipping carton.
3. Mark: "FRAGILE: INSECT-DISEASE SPECIMENS ENCLOSED; FOR SCIENTIFIC PURPOSES ONLY; NO COMMERCIAL VALUE".

Please report or submit samples
of forest or urban tree insects or
diseases to your local ALASKA
STATE FORESTRY OFFICE or to
one of the following addresses:

USDA FOREST SERVICE
Forest Pest Management
State and Private Forestry
2221 E. Northern Lights Blvd.
Suite 104
Anchorage, Alaska 99508
(Telephone 907-276-0939)

USDA FOREST SERVICE
Forest Pest Management
State and Private Forestry
P.O. Box 1628
Juneau, Alaska 99802
(Telephone 907-586-7301)

Cooperative Extension Service
University of Alaska
2651 Providence Drive
Anchorage, Alaska
(Telephone 907-786-1080